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CONTRIBUTIONS FROM THE GRAY HERBARIUM
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OVERLOOKED SPECIES, TRANSFERS AND
NOVELTIES IN THE FLORA OF
EASTERN NORTH AMERICA

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(Plates 807–816)

DURING a restudy of the *Liliaceae* of the Gray's Manual area I was soon confronted by the many species proposed by Rafinesque in one of his relatively careful and trustworthy works, *Autikon Botanikon* (1840), a book so rare, until the offset of it issued by the Arnold Arboretum, that only casual names from it (and those picked up through other sources) were caught by the editors of *Index Kewensis*, Dr. Merrill is engaged on a bibliographic study of great extent, dealing with this and other neglected works of Rafinesque. It is, consequently, not appropriate here to go into further detail than to note a few species in *Autikon Botanikon* which have immediately to be taken into account in my studies. Very soon I found Rafinesque referring to species of Bartram, and on checking Bartram's *Travels* (1791) the same situation was found: only casual names of species by Bartram were entered in *Index Kewensis*, these picked up from the writings of others who had cited them. Accordingly, it was necessary to study Bartram's *Travels*, with such limited knowledge of the flora of the southeastern United States as I have. The present Contribution, therefore, is made up partly of consideration of some of the species of Bartram, some in Rafinesque's

Autikon Botanikon, some based on study of photographs of types of Linnaeus in the *Liliaceae*, and the usual miscellany which has accumulated in recent months. The items are arranged in systematic sequence.

PANICUM (sub-§ LANUGINOSA) **Benneri**, sp. nov. (TAB. 807), planta cespitosa 1.7–3.5 dm. alta; culmis firmis erectis basi 1–1.5 mm. diametro, internodiis ad 7.5 cm. longis pilosis pilis adscendentibus; nodis barbatis; foliis lanceolatis firmis valde adscendentibus glabris vel subtus sparsissime breviterque pilosis 3.5–6.5 cm. longis 5–8 mm. latis 36–42-nerviis basi villosociliatis, vaginis subhorizontaliter hirsutis pilis 1–1.5 mm. longis basi bullatis, ligulis 2–3 mm. longis; paniculis primariis breviter exsertis ellipsoideo-ovoideis 2.5–6 cm. longis 1.5–4 cm. diametro, rhachi imo hirtello sparsissime villosoque, ramis patento-adscendentibus ramulis subsimplicibus, pedicellis 2–6 mm. longis glabris; spiculis pubescentibus ellipsoideis basi apiceque obtusis 2.2–2.6 mm. longis 1.2–1.4 mm. latis, gluma inferiore perbrevis deltoideo-rotundata subapiculata 0.5–0.8 mm. longa, superiore lemmateque sterile aequilongis valde costatis fructus lucidos subaequantibus.—NEW JERSEY: old field along Delaware River, about 1½ miles east of Raven Rock, Hunterdon County, June 7, 1941, *Walter M. Benner*, no. 9635, TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.

By the treatments of Hitchcock and Chase, of Hitchcock's *Manual* and my own manuscript-treatment *Panicum Benneri*, traced through the keys, comes directly to *P. villosissimum* Ell. Its very stiff habit, glabrous or essentially glabrous, short firm leaves, the very short and broad first glume of the spikelet, short-peduncled panicle, only slight (instead of usually pronounced) development of branches at the time of primary anthesis, and the relatively short and strongly pustular-based pubescence of the sheaths at once distinguish it. In *P. villosissimum* the culms are 2–7 dm. high and the leaf-blades of the vernal culms 6–11 cm. long, and 5–10 mm. wide, more or less pubescent on both faces; in *P. Benneri* the stiffly erect culms are 1.7–3.5 dm. high, the leaf-blades more lanceolate, 3.5–6.5 cm. long and 5–8 mm. wide, the upper surface hard and glabrous, the lower barely and minutely pilose, while the strongly pustular-based hairs of the sheaths of *P. Benneri* are shorter than the most often slender and more villous sheath-hairs of *P. villosissimum*. As above noted, *P. villosissimum*, while the vernal or primary panicles are intact, usually has well developed axillary

branches; in *P. Benneri* only a few, and those very short, such branches are developed. In *P. villosissimum* the fully developed primary panicles are 4–10 cm. long and on peduncles 0.3–1.7 dm. long; in *P. Benneri* the primary panicles are 2.5–6 cm. long and on peduncles only 0.5–4 cm. long. The first glume of *P. villosissimum* is ovate, one fourth to two fifths as long as the spikelet; in *P. Benneri* broadly deltoid-rotund and one fifth to barely one fourth the length of the spikelet.

In its very short and broad first glume the spikelet of *Panicum Benneri* suggests some variations of the heteromorphic *P. lanuginosum*, such as var. *fasciculatum* (Torr.) Fern. (*P. tennesseense* Ashe) or var. *septentrionale* Fern.; but its spikelets are altogether too large and the panicle too simply branched. In *P. lanuginosum* and its varieties the secondary branches of the panicle are themselves branched (whence *P. implicatum* Scribn.).

The once-forked branching of the panicle of *P. Benneri* is similar to that of *P. meridionale* (with spikelets 1.3–1.6, instead of 2.2–2.6 mm. long). It also suggests the panicle of the relatively northern *P. subvillosum* Ashe, but that characteristic species has the leaf-sheaths mostly equaling or exceeding, instead of shorter than the internodes, and appressed-pilose, instead of divergently hirsute with pustular-based hairs. Furthermore the axis of the panicle of *P. subvillosum* is appressed-pilose to glabrate, in *P. Benneri* divergently hirtellous, with some horizontally spreading villi; the spikelets of *P. subvillosum* are 1.8–2 mm. long, 0.9 mm. broad, and the prolonged first glume is one third to half the length of the spikelet.

Panicum Benneri, with which it is a privilege to associate the name of the keen and always helpful student of his local flora, WALTER MACKINNETT BENNER, its discoverer, seems to be a real species. Whether it is relatively northern, as its type-region suggests, we do not know. It is more likely so, and to be sought in northeastern Pennsylvania and southern New York, than an extension from farther south in New Jersey and Pennsylvania where the small army of keen explorers would long ago have found it. Mr. Benner has most generously defrayed the expense of PLATE 807.

In PLATE 807, FIGS. 1 and 2 are portions of the TYPE of PANICUM BENNERI, $\times 1$; FIG. 3, internode and cauline sheath, $\times 3$; FIG. 4, axis of panicle, $\times 10$; FIG. 5, spikelet, $\times 10$.

XYRIS ALBIFLORA Raf. Aut. Bot. 190 (1840). *X. torta pallescens* C. Mohr, Contrib. U. S. Nat. Herb. vi. (Pl. Life Alab.), 428 (1901). *X. pallescens* (C. Mohr) Small, Fl. Se. U. S. 234 and 1328 (1903).

This distinctive white-flowered species of northwestern Florida and Alabama is related to *X. flexuosa* Muhl. and *X. fimbriata* Ell. in having exserted and fimbriate sepal-tips. It was well characterized by Rafinesque, who recognized its affinity with the latter species:

1420, *X.* or *JUPICA?* *albiflora* Raf. (*X. cylindrica* Baldw. mpt.) fol. strictis ensatis lato-planis striatis, scapis duplo longior teres anceps. sulcatis, capitulis ellipt. subcyl. obt. bract. dilatatis integris vel emarg. —Florida, disc. by Baldw. in 1815, not yet described, unless *X. fimbriata* of Elliot be very badly so, and appears rather an akin sp. leaves pedal, scape bipedal. fl. white by a note of Baldwin, while all others are yellow.

X. FISTULOSA Raf. l. c. (1840), based upon *X. juncea* Baldw., not R. Br., is *X. BALDWINIANA* Schultes, Mant. (1822). His *X. RETUSA*, l. c. 190 and *X. SPIRALIS*, l. c., are apparently *X. TORTA* J. E. Sm.

LUZULA ACUMINATA Raf. Aut. Bot. 193 (1840). *L. saltuensis* Fernald in RHODORA, v. 195 (1903). *Juncooides pilosum* (L.) Coville, var. *saltuense* (Fern.) Farwell in Mich. Acad. Sci. Rep. xx. 170 (1918). *L. carolinae* S. Wats., var. *saltuensis* (Fern.) Fern. in RHODORA, xl. 404 (1938).

Luzula saltuensis of woodland and thicket from Newfoundland to Saskatchewan, south into the Northern States and locally southward, was separated from the cespitose Eurasian *L. pilosa* (L.) Willd. because of its looser habit, with elongate more or less repent basal offsets, its paler and acuminate sepals and its more pointed capsules. Later (in 1938) I reduced it to varietal rank under the poorly typified *L. carolinae* S. Wats. in Proc. Am. Acad. xiv. 302 (1879), the latter southeastern plant being larger and with more forking branches to the corymb. It now seems that Rafinesque was nearly 40 years ahead of Watson and more than 60 ahead of me. There can be no doubt that his *L. acuminata* was *L. saltuensis*. His definition of it was good:

1447, *Luz. acuminata* Raf. repens, glabra, fol. lanceol. acum. striatis nervosis spiculis corymbosis congestis paucifloris fuscatis, calic. acum.—Boreal America, perhaps *J. pilosus* Mg. often blended with last, leaves broader and shorter, 3 uncial, stem semipedal, corymb. not exceeding the leaves, fl. small.

The taking up of *Luzula acuminata* (1840) necessitates the following combination

L. ACUMINATA Raf., var. **carolinae** (S. Wats.), comb. nov. *L. carolinae* S. Wats. in Proc. Am. Acad. xiv. 302 (1879). *Juncoides* (as *Juncodes*) *carolinae* (S. Wats.) Ktze. Rev. Gen. ii. 724 (1891).

LUZULA LABRADORICA Raf. l. c. (1840) was unquestionably *L. PARVIFLORA* (Ehrh.) Desv. (1808) or its var. *melanocarpa* (Michx.) Buchenau, which latter rests on *Juncus melanocarpus* Michx. (1803). Rafinesque's name antedates *L. labradorica* Steud. Syn. Pl. Gram. ii. 291 (1855), which is perhaps identical with it.

Rafinesque proposed nine North American species of the prophyllate *Junci*. Nothing sufficiently distinctive was given in his descriptions for us to be certain what he had. His *J. FLORIDANUS*, l. c. 194, was from "South Florida" and Engelmann in Trans. St. Louis Acad. Sci. ii. 451 (1866) cited as *J. Gerardi* Loisel. (1810) material from "North Carolina, Curtis, and Florida, Ware (*J. Floridanus*, Raf. in Hb. Durand)". This would seem to dispose of *J. floridanus*. It also gives the clue, that others of Rafinesque's *Junci* may have been in Durand's herbarium, now in Paris. Rafinesque's *J. FUSCATUS*, l. c. 194, from "Kentucky, Tennessee, &c", with "fl. quite peculiar", was earlier than *J. fuscatus* Turcz. ex Ledeb. (1853), the latter reduced by Buchenau to *J. triglumis* L. *J. fuscatus* Raf. is not clearly identified. So with his other names; they may rest undisturbed.

THE IDENTITY OF *YUCCA FILAMENTOSA* (PLATES 808 and 809). —*Yucca*, always a baffling genus to work with from herbarium material, has one species, *Y. filamentosa* L., which is reputed to follow much of the Coastal Plain from Louisiana to Florida and northward to North Carolina, with a related plant, *Y. concava* Haw. or *Y. filamentosa*, subforma *latifolia* Engelm., on coastwise sands from Georgia to New Jersey. The tendency has been to follow the conclusions of Engelmann in Trans. St. Louis Acad. Sci. iii. 17-54 (1873). In that study, treating *Y. filamentosa* as a complex species, some of the varieties native, others only in cultivation, Engelmann defined what he considered true *Y. filamentosa*, his forma *genuina*, with two subforms: "a, angusti-

folia", a plant with linear-lanceolate leaves gradually attenuate from the middle; and *b*, subforma *latifolia*, = *Y. concava* Haw., with broad and rigid lanceolate or spatulate leaves obtusely mucronate and cucullate at tip. He concluded that the brief diagnosis quoted by Linnaeus from Gronovius, "foliis lanceolatis acuminatis together with the Hab. Virginia, points to the narrow-leaved form of what I have described as the genuine plant, as the one he and Gronovius had in view. Of this and other forms numerous specimens and full notes have been obtained from Dr. Mellichamp, of South Carolina, on which the following descriptions are based." Engelmann then went on to discuss the "narrow-leaved form" and the "broad-leaved variety", which in his Latin account were both subordinate to his "*Forma genuina*". In 1880 Baker, Journ. Linn. Soc. Bot. xviii. 227, 228 (1880), split *Y. filamentosa* into ten varieties, many of them cultivated only, with the broad natural range, "*Regiones littorales Americae borealis a Maryland ad Floridam*", treating *Y. concava* Haworth as *Y. filamentosa*, "var. *Y. concava*" and not citing *Y. filamentosa*, forma *genuina*, subf. *latifolia* Engelm. under it. Subsequently, Trelease, Mo. Bot. Gard. 13th Ann. Rep. 46-49 (1902), accepting Engelmann's and Baker's divisions in the main, likewise made typical *Y. filamentosa* the plant with "Leaves 25-40 cm. wide, gradually acute, rather rigid . . . Capsules rather narrowly cylindric", this plant shown in a photograph (his pl. 8, fig. 1) with narrowly linear-lanceolate and long, attenuate leaves, while its capsule (his pl. 12, fig. 1) was shown as 4-5 cm. long. This plant, taken by Engelmann, Baker, Trelease and subsequent authors as true *Y. filamentosa*, was assigned the range: "West-central North Carolina to southeastern South Carolina, Florida from Jacksonville to Tampa, and doubtless in the intervening country". The plant with shorter, broader, more oblong-ob lanceolate to spatulate and, in maturity, harshly scabrous heavy leaves, the *Y. filamentosa*, forma *genuina*, subf. *latifolia* Engelm., was taken up as var. *concava* (Haworth) Baker and a good portrait of a growing plant given (Trelease, pl. 10), showing the very characteristic and short, lanceolate, broad leaves, this very distinct plant given a range from South Carolina and Georgia to Maryland.

It remained for Small, Man. 303 (1933) to see stronger differ-

ences. Still adhering to the plant with "Leaf-blades of a linear type, somewhat narrowed toward both ends, attenuate to the slender apical spine, flat" as *Y. filamentosa*, with the range "Fla. to Miss., Tenn. and N. C.", this plant with "petals broadly ovate, 4–5 cm. long: capsule 5–6 cm. long", he correctly recognized another species, as *Y. concava*, with "Leaf-blades spatulate, abruptly narrowed or rounded and concave at the base of the stout apical spine", the species occurring from "Ga. to Del." and having "sepals and petals usually broader" than in the former and the capsule only 4–5 cm. long, the seeds rounder.

Ever since our first trip together to Virginia, Long and I have become very familiar there with the plant we have regularly called *Yucca concava*, following the treatment of Small. It occurs back of the outer beaches and among the dunes, and in sandy fields, roadsides and dry pineland back from the coast at least 80 miles (to the easternmost border of Dinwiddie County). Baker's "*Regiones littorales*" tells only part of the story. Throughout all this region of eastern Virginia, thence northward, the plant is constant in foliage, flowers and fruit, the plant beautifully illustrated in Sims, Bot. Mag. xxiii. pl. 900 (1806) as *Y. filamentosa*, its habit shown by Trelease, l. c. pl. 10. In this plant (our PLATE 808) the flowers are 5–7 cm. long, the petals 2–3 cm. broad and rounded to the short acumination, the filaments spiculate-papillate in irregular lines, the style in anthesis about 1 cm. long, the capsule thick-cylindric to short-ovoid, inclined to be constricted at or near the middle and dumbbell-like, 1.5–4.5 cm. long; the semiorbicular seeds 6–7 mm. long by 3–5.5 mm. broad.

In *Yucca filamentosa* sensu Engelmann, Baker, Trelease and others, including Small, who seems first to have recognized the best specific characters, the southern plant (our PLATE 809) with linear-lanceolate long-tapering leaves, the flowers are only 3–5 cm. long, the petals 1–2 cm. broad and tapering to gradually acuminate tips, the filaments nearly pilose with elongate trichomes (especially at base), the style at flowering time nearly obsolete or up to only 5 mm. long, the more uniformly subterete capsule 4–6 cm. long.

When Engelmann assumed, because he had material from South Carolina of the latter plant, that it must, therefore, be the

Virginian plant, "In littoribus arenosis fluminum crescit", of Clayton, which is the type of *Yucca filamentosa* L., he was at least naïve. Not all plants of South Carolina and Virginia are identical. In exploring the southeastern counties of Virginia Mr. Long and I have often noticed that farmers frequently set young plants of their native *Yucca* along roadways and in sandy clearings. Our driver for some seasons, a farmer of keen intelligence, Leonard Birdsall, explained that they harvest the hard leaves as "SILKGRASS", and after macerating them and softening the tissue, remove the strong threads for use in tying bunched vegetables. This plant, *Y. concava*, being the abundant and, so far as we know, the only native species of the genus in eastern Virginia, it is not surprising that the specimen preserved at the British Museum (photograph sent by Dr. RAMSBOTTOM) should show the characteristic flowers (PLATE 808, FIG. 1)—the two smallish ones at the tips of branches—of typical *Y. concava*, nor that Clayton's no. 720 (miscopied by Gronovius as 270), the TYPE of *Y. filamentosa*, should have been labeled by him: "Yucca flore albo, foliorum marginibus filamentosis. **Silkgrass.**"

The type of *Yucca filamentosa* L. Sp. Pl. 319 (1753) being the relatively northern *Y. concava*, it is necessary to find the proper specific name for *Y. filamentosa* sensu Small, the *Y. filamentosa*, forma *genuina*, subf. *angustifolia* of Engelman. Study of the bibliographies of Engelman, Baker and Trelease yielding none, I venture to name the narrow- and smoother-leaved southern plant for the botanist who first saw its specific differences. It is a pleasure so to do; it is not always that I can follow him. I am calling it

YUCCA Smalliana, sp. nov. *Y. filamentosa* sensu Small, Man. Se. Fl. 303 (1933), not L. *Y. filamentosa*, forma *genuina*, subf. *angustifolia* Engelm. in Trans. St. Louis Acad. Sci. iii. 51 (1873), not *Y. angustifolia* Pursh (1814). TYPE: sandy soil near Jacksonville, Florida, May, A. H. Curtiss, no. 2950, in Herb. Gray. PLATE 809.

Although Small states that the smaller-flowered and more southern *Yucca Smalliana* (*Y. filamentosa* sensu Small, not L.) has "panicle-branches glabrous", the material before me shows them merely glabrescent. At flowering time they are pruinose-pilose, only in fruit becoming glabrate. True northern *Y. filamentosa* has the panicle glabrous from the first. In its pubescent

panicle *Y. Smalliana* suggests the upland *Y. flaccida* Haw., of the Blue Ridge and adjacent uplands, which may have pubescent or glabrescent panicle; but, as I understand it, *Y. flaccida* has very pliable and thin leaves, very broad and abruptly short-acuminate petals (as shown in Lindl. Bot. Reg. xx. t. 1895 (1836)), and the native specimens which seem to belong to it have the style elongate and the broad and flat filaments coarsely ciliate. In *Y. Smalliana* (PL. 809) the flower is smaller, with much narrower and acuminate sepals and petals, the style obsolete or very short, and the filaments less flattened and finely pruinose-pilose.

PLATE 808 is of *YUCCA FILAMENTOSA* L.: FIG. 1, terminal flowers, $\times 1$, from the TYPE (from photograph sent by Dr. John Ramsbottom); FIG. 2, characteristic leaves, $\times \frac{1}{2}$, from Old Town Neck, Northampton County, Virginia, Fernald, Long & Fogg, no. 5269; FIGS. 3 and 4, flowers, $\times 1$, from Cape Henry, Virginia, Fernald, Griscom & Long, no. 4707; FIG. 5, ovary, style and filaments, $\times 3$, from no. 4707; FIG. 6, ripe capsules, $\times 1$, from south of South Quay, Virginia, Fernald & Long, no. 10,585.

PLATE 809, *YUCCA SMALLIANA* Fernald: FIG. 1, leaves and flowers, $\times \frac{1}{2}$, from TYPE; FIG. 2, basal rosette, greatly reduced, from Florida, photo. by A. H. Curtiss, 1887; FIGS. 3 and 4, flowers, $\times 1$, from TYPE; FIG. 5, ovary, style and filaments, $\times 3$, from TYPE; FIG. 6, capsule, $\times 1$, from Florida, A. H. Curtiss.

SPECIFIC DISTINCTIONS BETWEEN *POLYGONATUM BIFLORUM* AND *P. CANALICULATUM*.—More than a decade ago, while studying with me, Dr. W. A. Anderson, Jr. clearly worked out the proper nomenclature and the specific characters of our American species of *Polygonatum* and, although he published¹ his study of *Trillium* in Tennessee, he has, unfortunately, not stated in print his conclusions regarding *Polygonatum*. In the Manual range we have three indigenous species, *P. pubescens* (Willd.) Pursh, quickly distinguished by having superficial rhizomes, minutely pilose or hirtellous lower leaf-surfaces, lowest peduncle usually from the 1st or 2nd leaf-axil, perianth 7–13 mm. long, with stamens inserted high on the tube; and *P. biflorum* (Walt.) Ell. and *P. canaliculatum* (Muhl.) Pursh (*P. commutatum* (R. & S.) Dietr. and *P. giganteum* Dietr.), formerly needlessly confused and, judging from recent identifications, not usually understood, two very different species with deep-seated rhizomes, glabrous lower leaf-surfaces, lowest peduncle usually from the 3d–5th leaf-axil, perianth 1–2 cm. long, stamens inserted near middle of

¹ W. A. Anderson, Notes on the Flora of Tennessee: the Genus *Trillium*. RHODORA, xxxvi. 119–128 (1934).

the tube. Dr. Anderson, with the collaboration of Mr. C. A. Weatherby, found so many distinctive characters and in my own detailed study so many others become evident that it may be helpful to others to have these distinctions pointed out. The usual failure clearly to separate the two species, *P. biflorum* and *P. canaliculatum*, is reflected in many recent local floras. Thus Wiegand & Eames in their very helpful and usually keenly discriminating Flora of the Cayuga Lake Basin give two types of habitats for their inclusive *P. biflorum*: "Sandy or gravelly, rarely clayey, banks and thickets, in subneutral soil, on dry hill-sides and hilltops, or in alluvial calcareous soils on river banks". Several of the collections cited by them are represented in the Gray Herbarium. Those from "Sandy or gravelly . . . banks", etc. are characteristic *P. biflorum*: "dry ravine bank, between Renovick and McKinney's", etc., these plants having the characteristic slender rhizome, slender stem only 6-7 dm. high, flat and relatively few-nerved, merely sessile leaves, lowest peduncle from the 3d leaf-axil and 1.2-2 cm. long, with the 2 or 3 pedicels 0.5-1.4 cm. long, and slender perianth with lobes 3.5 mm. long. The material from "alluvial calcareous soils" is characteristic *P. canaliculatum*: "Valley of Inlet, Ithaca", etc., the plants with rhizome more than 2 cm. thick, stout stem (1 cm. thick) 2 m. high, with clasping-based corrugated and undulate-margined leaves with about 200 nerves, the flowering peduncles up to 9 cm. long, with 4-7 pedicels up to 2.5 cm. long, the thicker perianth with lobes 6 mm. long. Again, in that compendium of accurate local field-observation, Deam's Flora of Indiana, the author, beautifully distinguishing the pubescent-leaved *P. pubescens*, with superficial rhizome, from the glabrous-leaved plants with deep-seated rhizomes, which he unwillingly treated as one species, *P. biflorum*, wrote: "My study of this species complex was made from 155 specimens which I have collected from all parts of the state. I am not satisfied with the treatment of this species but I am not able to find differences sufficient to separate them . . . I do not think them all the same species . . . The genus has been monographed by three authors and my specimens have been seen by one of them but I cannot accept their treatment of this complex." Such observations indicate the need of better statements of the char-



Photo. B. G. Schubert.

YUCCA FILAMENTOSA: FIG. 1, flowers, $\times 1$, from TYPE; FIG. 2, leaves, $\times \frac{1}{2}$; FIGS. 3 and 4, flowers, $\times 1$; FIG. 5, ovary, style and filaments, $\times 5$; fig. 6, capsules, $\times 1$



Photo. B. G. Schubert.

YUCCA SMALLIANA: FIG. 1, leaves and flowers, $\times \frac{1}{2}$, from TYPE; FIG. 2, basal rosette, greatly reduced; FIGS. 3 and 4, flowers, $\times 1$, from TYPE; FIG. 5, ovary, style and filaments, $\times 3$; FIG. 6, capsule, $\times 1$

acters, and the misidentifications in the herbaria (including our recent collections from Virginia as identified by a student of the group) also indicate such a need.

Very briefly my conclusions follow:

POLYGONATUM BIFLORUM (Walt.) Ell. Rhizome 0.6–1.5 cm. thick; stem slender, 1.5–5 mm. thick below lowest leaf, 2–9 dm. high; leaves flat, sessile or nearly so, narrowly lanceolate to broadly ovate, the largest ones (of each plant) with 46–120 nerves and 5.5–15 cm. long by 1.2–6 cm. broad, the terminal small ones 20–66-nerved; peduncles 1–4 cm. long, 1–3 (–5)-flowered, the lowest usually borne from the 3d (1st–5th) axil; pedicels becoming 0.5–2 cm. long; perianth slenderly cylindric, 1–1.7 cm. long, its lobes 3–4 mm. long; filaments commonly papillate or granulose, slender; enlarged terminal joint of fruiting pedicel cupshaped or campanulate, with the rim flaring, 0.7–1.5 mm. long, often as broad; seeds 2.7–3.5 mm. long.—Dry to moist, sandy, loamy or rocky woods and thickets, Florida to Texas, north to Connecticut, New York, southern Ontario, southern Michigan, Illinois, Iowa and Nebraska.

P. CANALICULATUM (Muhl.) Pursh. Rhizome 1.5–3 cm. thick; stem stout, 0.5–1.3 cm. thick at lowest leaves, 0.6–2 m. high; leaves more or less corrugated and with puckered margin (not drying flat), mostly narrowed to broad clasping or sheathing subpetiolar bases, the larger ones with 110–220 nerves and 0.9–2.5 dm. long by 3.5–13 cm. broad, the smallest terminal ones 58–112-nerved; peduncles becoming 1.5–9 cm. long, 2–10-flowered, the lowest commonly borne from the 4th or 5th (3rd–8th) axil; perianth thick-cylindric, 1.7–2 cm. long, its lobes 5–6.5 mm. long; filaments broad, smooth or merely granulose; enlarged terminal joint of fruiting pedicel subcylindric to slenderly campanulate (except at flaring summit), 1–3 mm. long, usually longer than thick; seeds 3–4.5 mm. long.—Rich woods, alluvial thickets, river-silts and other calcareous habitats, Connecticut Valley of New Hampshire to southern Manitoba, south to South Carolina, Tennessee, Missouri and Oklahoma.

Many reputed species and varieties have been proposed, based upon shade of color, breadth of leaf, etc. These I am not here discussing. That is for a monographer who has studied them all. So far as I have seen they do not affect the fundamental specific characters of the species long ago defined. In fact, I have recently been challenged to point out any *real* characters distinguishing *P. canaliculatum* from *P. biflorum*. The above is my answer. What better characters could be found in the *Liliaceae*?

The position of the lowest peduncle, a splendid character pointed out by Deam, is certainly significant. I have noted its position in all specimens in the Gray Herbarium and that of the New England Botanical Club. The results follow.

P. PUBESCENS: of 365 plants 100 (27 + per cent.) have the lowest peduncle from the 1st axil, 241 (66 + per cent.) from the 2nd, 20 from the 3rd and only 1 from the 4th.

P. BIFLORUM: of 116 plants 3 have the lowest peduncle from the 1st axil, 12 (10 per cent.) from the 2nd, 68 (59 + per cent.) from the 3rd, 28 (24 + per cent.) from the 4th, and 5 from the 5th.

P. CANALICULATUM: of 41 specimens 4 (10 per cent.) have the lowest peduncle from the 3rd axil, 17 (41 + per cent.) from the 4th, 13 (31 + per cent.) from the 5th, 1 from the 6th, 2 from the 7th, and 1 from the 8th.

A biologically interesting form, because flowering from elongate leafy axillary branches, of *Polygonatum biflorum* is

P. BIFLORUM, forma **ramosum** (McGivney), comb. nov. *P. commutatum*, forma *ramosum* McGivney in Am. Midl. Nat. ix. 664, fig. (1925).

THE INDIGENOUS ALLEGHENIAN CONVALLARIA.—The native Lily-of-the-Valley, occurring in acid rocky or sandy woods, summits and upper ravines of the mountains from Virginia and eastern West Virginia to northern Georgia and eastern Tennessee, is much larger than the European *Convallaria majalis* L., the plant so generally cultivated and naturalized near settlements; and, as Professor Massey writes me, no one knowing its stations high on the mountains would think of calling it "of the Valley." In the European species the scape is elongate, so that the flowers are borne opposite the middle or upper halves of the leaves; the leafy axis (to the base of the upper leaf) is, except in highly cultivated plants, 5–12 cm. high, with the larger leaves 1–2 dm. long and 3–7.5 cm. broad, their veins and cross-partitions, as seen by transmitted light, relatively faint and pale; the longer bracts of the raceme are lanceolate, 4–10 mm. long, and much shorter than the pedicels; and the seeds are nearly globose. In the native eastern American species the scape and raceme are shorter than the leafy axis or barely reaching the lower half of the lowest leaf; the leafy axis is 1.5–2 dm. high, with the larger clear green (not glaucescent) leaves 1.5–3 dm. long and 4–12 cm. broad, strongly nerved, the dark nerves and cross-partitions sharply visible by transmitted light; the longest bracts of the

raceme are almost linear, 0.8–2 cm. long and nearly equaling to much exceeding the pedicels; and the seeds are compressed, either oblate or somewhat lenticular.

In recent years the Alleghenian native has been known as *Convallaria majuscula* Greene in Fedde, Rep. Nov. Spec. v. 46 (1908). Greene proposed two species, *C. globosa*, l. c., a plant cultivated by the late Robert Ridgway who received it from a dealer as found in the mountains of North Carolina, and *C. majuscula*, “occasionally collected in the higher mountains of Virginia, from the Peaks of Otter northward; also in those of southeastern Pennsylvania. . . . it differs totally from that [*C. majalis*] in its very large light-green leaves without trace of bloom, with excessively fibrous anatomy, insomuch that the surface of the leaf when growing looks to be plicate rather than plane and even. Both these American species . . . when compared with *C. majalis*, flower much later, their foliage perishing at the end of summer.” There are no evident specific characters separating the cultivated *C. globosa* and the indigenous plant of western Virginia, therefore the name *C. majuscula* has come into use.

There is, however, a perfectly available name for the native plant, which was well described 68 years before Greene’s publication. This is *Convallaria montana* Raf. Aut. Bot. 66 (1840). Rafinesque’s account, quite as good as Greene’s, was as follows:

486, *Conval, montana* Raf. (pseudlo-majalis Bartr. in Rees cycl. Am. ed.) fol. binis sessilib. ovatoobl. acum. scapo angul. fol. subeq. racemo 10–12 floris, bract. lanc. ad ped. eq. fl. secundis—Unaka and Cherokis Mts. large plant, leaves 6 to 8 inches long, 2 wide, fl. size of *C. majalis*. Bartram says the berries are blue and ovate. *C. majalis* has leaves petiolate elliptic acute at both ends, raceme of 7–8 fl. bracts half length of pedicels.

Rafinesque had, also, a *Convallaria parviflora*, l. c. with “scapo filif. fol. brevior.” etc., from “Appalachian and Wasioto Mts.” Whether this was small-flowered *C. montana* or the introduced plant I do not feel certain, but the identity of *C. montana* and *C. majuscula* can hardly be questioned.

From Rafinesque’s reference to Bartram it would appear that the latter had still earlier given the correct name to our native *Convallaria*. In Rees Cycl. Am. ed. x. (1810 or later), after the original British treatment there occurs the following unsigned and bracketed note:

[To these we will add, from Bartram, *C. pseudo-majalis*, mountain lilly of the valley. This charming plant is indigenous to the mountainous parts of the United States of America, particularly the country of the Cherokees, in the rich glades or shady vallies in their mountains, and in the like situations in Pennsylvania. It differs but little from *C. majalis* of Europe, only is larger every way, and the fruit blue and more oblong to ovate.]

Here, of course, was where Rafinesque got his quotation from Bartram about the blue berries. In his Travels (1791) Bartram repeatedly noted *Convallaria majalis* from the upper slopes of the Cherokee country but I have been unable to find him giving in print a new name or noting the "blue" berries. Since *C. montana* (or *C. majuscula*) has, as I am assured by Professor Massey and others who are familiar with it in the wild, RED berries we can hardly accept *C. pseudo-majalis* as properly diagnosed. Bartram could quite as well have had *Polygonatum*! The synonymy of our native species is as follows:

CONVALLARIA MONTANA Raf. Aut. Bot. 66 (1840), excluding the synonym *C. pseudo-majalis* Bartr. ex Rees Cycl. Am. ed. x (1810 or later) as too doubtful on account of the blue fruit. ?*C. parviflora* Raf. l. c. (1840). *C. globosa* Greene in Fedde, Rep. Nov. Spec. v. 46 (1908). *C. majuscula* Greene, l. c. (1908); Fernald in RHODORA, xxx. 184, foot-note (1928) and xxxix. 347, foot-note (1937).

TRILLIUM CATESBAEI AND T. NERVOSUM Ell. (PLATES 810 and 811).—Elliott, Sk. i. 429 (1917), described two new species, *Trillium Catesbaei* and *T. nervosum*. The first, which he took to be the same as the plant illustrated by Catesby, Nat. Hist. Carol. etc., i. t. 45, as *Solanum triphyllon; flore hexapetalo, carneo* (OUR PLATE 810, FIG. 1) was described as follows

8. CATESBAEI. E.

T. pedunculo recurvato; petalis lanceolatis, calyce majoribus; foliis obovatis ovalibusque, acuminatis, basi attenuatis. E.

Peduncle recurved; petals lanceolate, larger than the calyx; leaves obovate and oval, acuminate, tapering at base.

Catesby, Carol. p. 45, t. 45.

T. cernuum, Michx. 1. p. 216?

Leaves 4–6 inches long, rather obovate, 3 inches wide, tapering to the base and not abruptly acuminate at the summit. *Petals* lanceolate, expanding, undulate, rose coloured. *Leaves of the calyx* long, narrow.

[Then a paragraph of more or less pertinent observation, with the conclusion that his plant, coming from the same region as Catesby's, must be identical.]

Pendelton county, South-Carolina; Mesrs. Baker & Perry.

The second of these new species (our PLATE 810, FIG. 2) was

9. NERVOSUM. E.

T. pedunculo recurvato; petalis oblongo-lanceolatis, calyce majoribus; foliis lanceolatis ovatisque, utrinque acutis, membranaceis, nervosis. E.

Peduncle recurved; petals oblong lanceolate, larger than the calyx; leaves lanceolate and ovate, acute at each end, membranaceous, nerved.

Plant 6–8 inches high. *Leaves* generally narrower than those of the *T. sessile*, most commonly lanceolate, membranaceous, somewhat 3 nerved. *Peduncles* about an inch long. *Petals* rose coloured.

Grows in the upper and middle country of Georgia and Carolina. Athens; Mr. Green. The *T. cernuum* of Walter probably belongs to this species.

Now, if anything is clear, it is that the plants which Elliott was describing differed strikingly as follows: *T. Catesbaei* with “rather obovate” leaves 3 inches broad, *T. nervosum* with them lanceolate and ovate (“most commonly lanceolate”) tapering at both ends.

Most fortunately, Elliott’s Herbarium, which, in the past suffered serious destruction by insects, mould and the removal of specimens, still contains these two types in good condition. They were photographed in October, 1941, by Mr. and Mrs. Weatherby, their photographs (our PLATE 810) now in the Gray Herbarium. Although it is, as said, most fortunate that the types exist and closely agree with Elliott’s descriptions, it is most unfortunate that Elliott identified his plant with obovate-oval broad leaves with Catesby’s plate and, consequently, called this species *T. Catesbaei*. The type of *T. Catesbaei* has elongate, curving stigmas sessile at the summit of the ovary, while its petals are pretty broad to be called lanceolate. The type of the narrow- and tapering-leaved *T. nervosum* has a definite style capping the ovary (PLATE 810, FIG. 2). In other words, the type of *T. nervosum* is identifiable with *T. stylosum* Nutt. Now, if Catesby’s plate be examined it will be seen (our PLATE 811) that the leaves are those of *T. nervosum* and that, in the Catesby drawing of the fruit (our FIG. 2) there is a definite style. Elliott evidently “got the wires crossed” and identified the Catesby plate with the wrong plant; and Rendle, Journ. Bot. xxxix. 333 (1901), said “In the absence of the specimens which Elliott had before him, Catesby’s figure (which he cites) is the only authority for this species.” He, therefore, took up *T. Catesbaei* for the

narrow-leaved plant with definite style as impressionistically shown in Catesby's plate (impressionistically, because Catesby had the sepals beautifully roseate and petaloid, just like the petals!) and a plant of the Carolina mountains with broadly rhombic leaves he described and illustrated as *T. Rugelii* Rendle in Journ. Bot. xxxix. 381, t. 426 B (1901). Rendle's illustration shows broadly rhombic leaves 11.5 cm. wide; material from the same general region, Highlands, North Carolina, April, 1903, *Harbison*, has them less broadly tapering at base, tending to obovate and 6–9.5 cm. broad; Harper's no. 1891 from Randolph County, Georgia, generally identified with *T. Rugelii*, has them in outline nearly as in the type of *T. Catesbaei* and 9–12 cm. broad; and Harper's no. 3492 from Tuscaloosa County, Alabama, has them definitely rhombic-obovate and 7.5 cm. broad; while the type of *T. Catesbaei* has them 9–10 cm. broad. All these, as I understand the plants, show the usual range of variation in the leaves and are all *T. CATESBAEI* Ell. (1817). They are also *T. Rugelii* Rendle (1901), for, since "the absence of the specimens which Elliott had before him" is now rectified by looking in Elliott's Herbarium at Charleston, not in the British Museum, the identity of *T. Catesbaei* has become clarified.

Early Carolina botanists clearly recognized that *T. nervosum* Ell. (1817) was the same as *T. stylosum* Nutt. (1818) and many sheets from M. A. Curtis had both names (often bracketed) on their labels. They were right. The error occurred when *T. nervosum* was dropped (as by Small) and *T. Catesbaei* (following the gratuitous assumption of Rendle) was wrongly used in the sense of *T. stylosum*.

IN PLATE 810, FIG. 1 is the TYPE of TRILLIUM CATESBAEI Elliott, $\times 1$, after a photograph by C. A. and Una F. Weatherby. FIGS. 2 and 3, *T. NERVOSUM* Ell.: FIG. 2, the TYPE-SHEET $\times \frac{1}{2}$, after a photograph by C. A. and Una F. Weatherby; FIG. 3, detail of flower in central specimen of fig. 2, to show style, $\times 3$.

PLATE 811, FIGS. 1 and 2, portions of Catesby's plate of *Solanum triphyllon*; *flore hexapetalo, carneo*, Nat. Hist. Carol. i. t. 45: FIG. 1, flowering summit, $\times 1$; FIG. 2, fruit, showing style, $\times 1$. FIG. 3, leaf, $\times 1$, of TYPE of SMILAX BONANOX L., var. EXAURICULATA Fernald.

TRILLIUM FLEXIPES Raf. Aut. Bot. 133 (1840). *T. erectum*, var. *declinatum* Gray, Man. ed. 5: 523 (1867). *T. declinatum* (Gray) Gleason in Bull. Torr. Bot. Cl. xxxiii. 389 (1906), not Raf. Aut. Bot. 135 (1840). *T. Gleasoni* Fernald in RHODORA, xxxiv. 21 (1932).

Rafinesque's description of *Trillium flexipes* was unusually good, for him:

968, *Tril. A* [i. e. his subgenus *Anthopium*, with peduncled flowers and sessile stigmas] *flexipes* Raf. caule sulcato, fol. sessil. obovatis acuminatis undul. 3nervis, pedunc. equante inclinato flexuoso, calix lanceol. acum. petalis albis eq. obl. acut. undul.—West Kentucky and Tennessee, rare, pedal, leaves 3 inches long, 2 broad, flowers middle size.

The inclined peduncle about equaling (in early anthesis) the sessile, acuminate, obovate leaves, the acuminate, lanceolate sepals and the equal, oblong white petals are all good characters of *Trillium Gleasoni*. That it occurs in western Kentucky there can be no question. Witness *Shacklette*, no. 378 from Union County, Kentucky. Wiegand & Eames, in their study of the group, cited it from Tennessee in *RHODORA*, xxv. 190 (1923) as did Small (Man.); and it occurs in eastern Missouri. There is no reasonable doubt about *T. flexipes*. The form with maroon or purple petals is

Forma **Walpolei** (Farw.), comb. nov. *T. cernuum*, var. *declinatum*, forma *Walpolei* Farw. in Rep. Mich. Acad. Sci. xxi. 363 (1920).

T. DECLINATUM Raf. l. c. 135 (1840) and *T. BALDUINIANUM* Raf. l. c. 135 (1840) are probably both forms of *T. NERVOSUM* Ell.

T. LANCIFOLIUM Raf. l. c. 132 (1840) can hardly be anything but *T. recurvatum*, var.(?) *lanceolatum* (Boykin) S. Wats. in Proc. Am. Acad. xiv. 273 (1879), based upon *T. LANCEOLATUM* Boykin in herb. in Wats. l. c. 274 (1879). Watson treated *T. lanceolatum* as a doubtful variety of the northern and wide-ranging *T. recurvatum* Beck, but, as Small, Bull. Torr. Bot. Cl. xxiv. 171 and 174 (1897), showed, the two are well distinguished species. Small (Man.) gives the range of *T. lanceolatum* as "W. Fla. to La., Tenn. and Ga." and in *RHODORA*, xlv. plate 773, fig. 3 (1943), I showed, life-size, the summit of a characteristic plant, $\times 1$, from northwestern Florida, the original specimen 11 inches high. If Rafinesque's description be compared with this figure the identity of *T. lanceolatum* Boykin (1879) and *T. lancifolium* Raf. (1840) will be apparent:

962, *Tril. S.* [subgenus *Sessilium*] *lancifolium* Raf. caule elato, fol. sess. lanceol. acutis trinervis patulis planis sepe maculatis, calicib. patulis vel reflexis, petalis erectis longior rubris unguic. lanceol.—Florida to Alabama and Apalachian Mts. stem often pedal leaves 3 inches, flowers uncial.

As to "flowers uncial.", the petals vary from 1.5–4.5 cm. long, the lower measurement being less than "uncial."

We do not know true *Trillium lancifolium* (*T. lanceolatum*) in the Gray's Manual area, although Rendle, Journ. Bot. xxxix. 327 (1901), referred to "Specimens which I have seen from Kentucky (*Short*)". The specimens which are in American herbaria, accompanied by Short's label with the print, "C. W. SHORT, M.D. KENTUCKY, 1840" fortunately bear, in his hand, the written memorandum, "From Dr. Boykin, Ga.". In other words, they are isotypes of Boykin's species.

T. CUNEATUM Raf. Aut. Bot. 133 (1840). *T. Hugerii* Small, Fl. Se. U. S. 277 and 1328 (1903).

Trillium cuneatum was thus described:

964, *Tril. S.* [subgenus *Sessilium*] *cuneatum* Raf. caule elato, fol. sessilib. ovatoobl. acutis trinervis planis concolor, calicib. erectis obl. petalis cuneatis duplo longior acutis purpurascens.—Unaka Mts. of Cherokee, pedal leaves 3 inches, flowers large akin to those of *Tr. maculatum*, but leaves very different.

It is most difficult to believe that Rafinesque's plant from the Cherokee country, with ovate-oblong acute green leaves, oblong sepals and cuneate purplish petals twice as long as the sepals is not the characteristic large-flowered *T. Hugerii* (type from Tryon Mt., North Carolina), which abounds in the Appalachian region from northwestern Florida and Alabama northward to North Carolina and Kentucky. Rafinesque compared it with his earlier published *T. maculatum*, "of the coastal plain and piedmont regions from the Carolinas to Alabama and Mississippi", with, further, to quote Dr. W. A. Anderson in RHODORA, xxxvi. 122, 123 (1934), "leaves . . . lance-ovate, . . . strongly mottled, mottling tending to form longitudinal stripes; sepals 2.5–5 cm. long. . . , lanceolate, acute; petals 3.5–6 cm. long". Anderson, identifying *T. MACULATUM* Raf. (1830) with *T. Underwoodii* Small (1897), said "Among the numerous species of *Trillium* described by Rafinesque, this one is unmistakable".

By Small (Man.) his Coastal Plain *Trillium Underwoodii* (*T. maculatum* Raf.) is, in the key, separated from his montane *T. Hugerii* (*T. cuneatum* Raf.) by its narrower leaves ("bracts"), in the former "much longer than wide, often twice as long", in the



Photo B. G. Schubert.

TRILLIUM CATESBAEI: FIG. 1, TYPE, $\times 1$, after photograph by C. A. and Una F. Weatherby
 TRILLIUM NERVOSUM: FIG. 2, TYPE-SHEET, $\times \frac{1}{2}$, after photograph by C. A. and Una F. Weatherby;
 FIG. 3, detail, to show style, $\times 3$